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Safety first? Production pressures and the implications for safety and health

Abstract

The prominence of production, schedule, cost and economic wellbeing in government policy and review is explored and contrasted with the status of safety. The connection between productivity as an objective and safety as a constraint is reviewed, though it can be concluded that in spite of widespread belief of a connection there is very little empirical causal evidence for high production pressure causing negative effects on safety. Nevertheless, the inverse is mooted, that high levels of safety has had a negative impact on productivity in construction. This possibility is discussed in the context of government rhetoric which tends to be highly critical of construction’s economic shortcomings yet quite silent on the matter of its safety successes. The essay concludes with a possible vision for the future that allows safety and productivity to be re-positioned in terms of their potential symbiosis.

Keywords

Productivity, Economy, Performance improvement, Safety, Health

Introduction – The Value of Construction, the Desire for Performance and the Need for Safety

In most developed countries, and in many developing, the role and significance of the construction industry in the economic wellbeing of that country is clear. Construction is able to contribute to the productive capacity of a nation – it provides employment, flow of capital and in almost all of its sectors it increases the physical stock through its provision of infrastructure (Giang and Low, 2011). This relationship between economy expansion and investment in capital stocks has long been recognised. Early work in the 1940s (for instance Domar, 1947) considered employment and its connection with growth rate, and the 1990s saw a burst of scholarly activity that empirically demonstrated ‘the relationship between infrastructure and economic growth’ (Sanchez-Robles, 1998).

This makes it very understandable why governments place such a priority on the performance of the construction industry and why this priority is manifested in policy requirements, expectations and criticism of the industry. In this essay I shall situate this pressure within the unavoidable context of safety. My intention is not to demonstrate a causal effect of productivity and production pressure on safety. Whilst that idea is at the heart of my argument, I wish to first understand the relative priorities of these two very different concepts but also, secondly, to hypothesise that there may well be a reverse link between them: does a focus on safety affect productivity? I will conclude with a consideration of how these notions may be taken forward, with a research agenda for our community posited.

It is initially worth reflecting, however, on whether construction's contribution to national economy is as universally positive as we are led to believe. Seeds of doubt are emerging, not least because we have two decades of infrastructure investment in China to reflect on. Ansar et al (2016) argue that this has potentially led to economic fragility and that unless infrastructure is developed with the full intention of meeting the identified needs of society then investment may at best show benefits shortfalls, and at worst may 'destroy economic value' (ibid). This should not be a surprise: referencing Domar (1947) again shows it was recognised at least eight decades ago that supply does not automatically create its own demand. While massive investment in construction and infrastructure contributes to employment, if new capital remains unused it is a waste of resources. A consequence of course is to consider what to do with those employed in the provision of the now complete infrastructure. Not all economies, after all, have the option of following the Chinese in exporting their employment and expertise in creating a 'New Silk Road' (Bruce-Lockhart, 2016). A further example could be the slightly different story that has emerged in Turkey, with construction being used as a political tool to provide employment and economic stimulation and yet has resulted in oversupply and a debt situation proving very sensitive to plummeting currency values.

Governmental Reviews – A Long History of Productivity Concern

But in spite of some calls for caution, a strong, prosperous and *productive* construction industry remains highly desirable. In the UK this has been the case for many years with

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3 successive 'reports' calling for productivity improvements. Murray and Langford (2003)
4 provide a usefully detailed review of the UK's propensity to produce reports on industry
5 performance. It is perhaps Phillips, in 1950, that first raises productivity specifically, noting
6 that public clients seek better performance from the industry through improvements in
7 labour productivity and, while post Second World War conditions led to low productivity in
8 all industries, successive reports gain an air of frustration that Construction is not improving
9 in the manner that other industries seemed to enjoy. While 'earlier reports provide vague
10 generalisations about what performance improvement is possible and how it may be
11 achieved' (Murray and Langford, 2003) by the 1990s the obsession with measurability took
12 hold and targets of one form or another were set. Latham, in 1994, while focussing mostly
13 on procurement, contractual arrangements and teamwork insisted on including productivity
14 improvement targets in his recommendations (a 30% real cost reduction over the following
15 6 years). He fell short of reintroducing a National Construction Productivity Centre, first
16 mooted by contractors in 1990 (National Contractors Group, 1990) but the emphasis on
17 construction's contribution to economic prosperity, and highlighting of its productivity
18 failings, was unabashed.
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32 Egan, four years later (1998), continued the calls for productivity improvements and general
33 industry criticism – calling it out for under-achieving and holding up the retail, steel and car
34 manufacturing industries' glowing record in productivity in a manner surely intended to
35 embarrass and demean the construction industry. Here the productivity target was stated in
36 terms of 'value added per head' with a 10% improvement expected per year (i.e. twice the
37 expectation set by Latham).
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44 More recently the Construction 2025 Strategy (HM Government 2013) refreshed the
45 expectation of the construction industry to do its bit for the UK's global position. Here, the
46 improvements were stated not as targets but as 'aspirations' yet the figures remain similar –
47 33% lower costs with 50% faster delivery by 2025. The implication here is clear – we, the
48 government seems to be saying, do not think you are working as fast or as effectively or
49 efficiently as you can.
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The precise expectation on the industry is blurred – there is mixed use of *productivity, growth, cost-reduction, speed* etc. Until late 2016 the UK's rate of growth was impressive, though dropped in 2017 largely through Brexit uncertainties, but productivity has been poor. For many years it has been significantly lower than the G7 average (Office for National Statistics, 2017) with construction even lower – UK construction has not seen any significant increase in productivity in 20 years (NBS, 2014).

Productivity and its Measurement Conundrum

The Farmer Review in 2016 (Farmer, 2016) is extremely critical of the construction industry's performance, productivity in particular, though acknowledging that "...poor productivity growth in construction is not just a UK phenomenon ..." Indeed, the World Economic Forum reported (2016) that in most countries of the world any productivity improvements have been 'meagre' with the US showing a near 20% decline in labour productivity since 1964. While data heterogeneity makes international comparisons extremely difficult, Abdel-Wahab and Vogl (2011) conclude that between 1990 and 2005 Germany and Japan both showed negative productivity growth rates in construction. Barbosa et al (2017) report that global labour-productivity growth in construction averaged only 1 percent per year since 1990. They conclude that if construction-sector productivity were to match that of all economies then an estimated \$1.6trillion would be added to the global economy.

There are two sides to the productivity debate. As I will argue, and as other authors have noted, declining productivity figures could just as likely be a problem with the manner of measuring it as it is with actual performance issues. Pan (2018) for instance notes significant changes in global construction – climate change, resource scarcity as well as opportunities such as automation and visualisation all require more sophisticated performance evaluations are put in place other than a simple comparison of output to input. But until that happens the pressure to perform remains and all of the above demonstrates the very high level of pressure the construction industry is facing to improve its performance in time, cost and output. There is inevitably a trickle down through the tiers, each successively repeating expectations of maintaining speed and cost. Contractors inevitably focus on their programmes and budgets, as they have always done.

Is Safety First? Or is it Productivity?

Having set the scene for the emphasis on production I now turn to the other side of this essay and the first two words of its title. Is safety first? The irony here is that there is a contrast between the castigations the industry has faced in terms of its economic performance and the success of its safety achievements – in UK and other high safety performing countries at least. The Construction 2025 strategy (HM Government 2013) while calling for UK Construction cost and time improvements simultaneously alludes to its “existing world class reputation in health and safety”. This is a genuine and deserved reputation, general trends of fatalities in construction have dropped over the last three decades in many countries (the most recent UK figures are ‘the lowest on record’ (Health and Safety Executive 2017)) and focus on occupational health, including mental health and wellbeing, is increasing internationally. Nevertheless, the meaning of the Construction 2025 words is clear – here are your objectives in time and cost, but we expect you to deliver to the same constraints of safety and health.

This provides the construction industry with an interesting nexus and tension – productivity or safety? Can a contractor maintain them both? A link between the two is acknowledged, internationally, by many in industry and in academic research and this has been done in a number of different contexts. Sherratt and Sherratt (2017) for instance argue that the emergence of the neoliberal paradigm in the 1980s places an inevitable yet unnecessary pressure on corporate bodies to focus on profit and shareholder returns rather than focus their attention on worker health, safety and wellbeing. Such discourse is valuable and persuasive yet empirical evidence of a causal link between productivity and safety is not extensive. In 2014 this journal’s special issue on Productivity Improvement in the Construction Industry (see Kenley, 2014) only one article considered a link with Gatti et al (2014) providing details of a US study on the relationship between physical strain and individual productivity. This concept of how an outcome of increased productivity provides for an effect on safety is explored by a number of scholars. Again, in the US, Han et al (2014) for instance developed a system dynamics model for investigating the relationship between schedule and safety measures, though were only able to test this via a case study and not extensive empirical data. A systems view is also considered by Mitropoulos et al (2005), who

prepared an accident causation model that considers the production factors that generate hazardous situations. This work is partly developed from that of Rasmussen (1997) who considered the safety behaviour of an individual is partly dictated by the presence of production efficiency expectations.

Hinze (1996) proposed a 'Distraction Theory' in which factors such as time pressure distract workers from attention to hazards and later (Hinze, 1997) he demonstrated that the schedule status of projects is correlated to the frequency of injuries. Haslam et al (2005) and Suraji et al (2001) consider 'distal' factors such as project conditions and economic climate being originating influences in accidents.

But the direct influence of production and time pressure on safety incident causation is quite difficult to come by, however. While Oswald et al (2013) concluded that 'time pressure' was a 'very high' influence on on-site accidents this was again a case-study based investigation that concluded a great number of other relevant factors such as experience and alcohol and drugs could be significant. Nevertheless, when production pressures through schedule issues arise it is rare to see risk assessments, method statements and welfare provisions simultaneously modified.

The issue is relevant in other fields of course with a lot of studies, for example, considering human reasoning under time pressure in healthcare systems; Holden et al (2011) is a good example, providing a correlation between workload and medication errors. Rundmo et al (1998) considered the situation in Norwegian Offshore operations. Brown et al (2000) consider production pressure among other factors in the US steel industry and, in yet one more example, data from 722 US grain industry workers (Seo, 2005) showed that perceived work pressure affected a perception of safety climate and thus unsafe work behaviour in that industry. Many of these studies, however, rely on perception data through employee surveys – direct empirical evidence of real effects of production and worker pressure being very difficult, it seems, to obtain.

The Consequences of High Safety

So here we come to what is an untested but attractive proposition: the idea that dominance of productivity in construction has negative consequences on safety is largely accepted, even if evidence of direct causation is hard to come by. But perhaps, conversely, dominance of safety values in construction has had a negative effect on productivity and this could be an explanation in part for the poor productivity statistics particularly in developed nations of the world. There is unlikely to be a linear correlation and it is not simply that the effort required for good safety equals low productivity – poor safety also has its consequences and the individual effects of safety incidents on morale and motivation are often reported. At the other end of the spectrum, as implied below, there is no reason why good safety cannot lead to higher levels of productivity. Another explanation could be that productivity statistics are simply incomplete measurements. In a similar example, Sezer and Bröchner (2014) argue that long-term productivity measurement does not, but should, account for changes in quality over the same time periods. Perhaps a similar argument for the incorporation of long term safety trends in productivity measurement could be made?

The global construction industry has received bad press for its perceived failings in productivity, but perhaps this is partly a result of its prominent and effective efforts in protecting the worker. The question is whether this balance is acceptable to governments, clients and the economy in general? How attractive is an industry that has a genuine interest in the societal benefits of worker wellbeing, even if it slips in its productive effort? In pondering these questions, consider this: the admonishment our industry receives for its economic failings is in stark contrast to the shocking absence of significant celebration of its safety and health achievements. This gives a hint of the high level priorities between worker and economic prosperity that successive global governments have shown.

To Conclude: Alternative Thinking and a Call for Research

I finish with a useful glimpse of how a utopian future for safety and production might be realised. Jia et al (2017) considered this concept whereby two institutional logics were identified, at a project organisation level, through ethnographic observation: a protection logic and a production logic. In the former, workers “intrinsically protect their personal interest by staying safe as much as they can” and in turn, if employers demonstrate their

positive attitude to safety then they concluded that workers are more likely to be motivated and increase productivity. In the production logic, on the other hand, safety was seen merely as an extra task, something that gets in the way of production. Clearly, if safety is seen merely as burden then it is extra work for similar output. Whereas if they are viewed as self-serving dualities, perhaps a kind of symbiotic relationship – safety can motivate positive production and vice-versa – then there is hope that workers can be safe as well as maintain productive output to government-level acceptable standards. Achieving this would need significant cultural, institutional and structural changes to the construction industry, not least continuing radical reform to reduce the reliance on the industry's intrinsic competitive procurement processes.

Further work on the nuanced relationship between productivity, time-pressure, safety, health and wellbeing is needed. I conclude my essay with a call for further work that can attempt to answer the following questions:

- While there seems to be an acceptance that pressure on productivity has a negative influence on safety, causal evidence is severely lacking. Can this be found?
- Is the opposite true – do enhanced construction safety practices and outcomes have any influence on the productivity of an individual firm or the industry generally? Can there be a symbiotic relationship whereby safety can positively influence productivity?
- How can productivity measurement and evaluation methods be developed to allow for 'non-output' attributes such as, among others, quality, safety, sustainability, and client satisfaction.

What I hope to have achieved in this brief essay is to highlight the disconnect between between safety and productivity in economic policy making; that safety need not be a constraint on project organisation but that by treating it as an objective, wider economic benefits may accrue; and that the accepted paradigm that project and economic success is measured only in time and cost is damaging to worker wellbeing. In 1994 Sir Michael Latham, in the foreword to his report *Constructing the Team*, spoke of the prize for the construction industry as being "enhanced performance in a healthier atmosphere". The context of his words make it difficult to appreciate whether he genuinely meant worker

health or more likely general economic health of the industry, but now, more than two decades later, this prize is still there, waiting on the podium for whoever has the desire and determination to win it.

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